Product Description: **T420HW05 TFT-LCD PANEL**	
AUO Model Name: **T420HW05 V0**	
Customer Part No. / Project Name:	
Customer Signature	**AU Optronics Corp.**
	Approved by: PM Head / Frank Hsu Frank Hsu.
	Reviewed by: RD Head / Eugene Chen Eugene Chen 2009.2.12
	Reviewed by: Project Leader / Jason Liu Jason Liu 2009.2.10
	Prepared by: PM / Alex Wang Alex Wang 2009.02.06
Note	

Document Version: 2.2
Date:2009/5/7

Product Functional Specification

42” Full-HD Color TFT-LCD Module
Model Name: T420HW05 V0

( ) Preliminary Specification
(*) Final Specification

Note : This specification is subject to change without notice.

Contents

No	ITEM
	COVER
	CONTENTS
	RECORD OF REVISIONS
1	GENERAL DESCRIPTION
2	ABSOLUTE MAXIMUM RATINGS
3	ELECTRICAL SPECIFICATIONS
3-1	ELECTRICAL CHARACTREISTICS
3-2	INTERFACE CONNECTIONS
3-3	SIGNAL TIMING SPECIFICATIONS
3-4	SIGNAL TIMING WAVEFORMS
3-5	COLOR INPUT DATA REFERNECE
3-6	POWER SEQUENCE
4	OPTICAL SPECIFICATIONS
5	MECHANICAL CHARACTERISTICS
6	RELIABILITY
7	INTERNATIONAL STANDARDS
7-1	SAFETY
7-2	EMC
8	PACKING
9	PRECAUTIONS

Record of Revision

Version	Date	Page	Old Description	New Description	Remark
1.0	2008/10/9		Preliminary specification first release		
1.1	2008/10/9	P11	fo=58KHz, IBL= 144mArms	3. fo=58KHz, IBL= 110mArms	
1.1	2008/10/9	P11	1. luminance is from 20% to 100%	1. luminance is from 10% to 100%	
1.1	2008/10/9	P11	Power Consumption Min=162 ; typ=170 ; max=178	Power Consumption Min=119 ; typ=125 ; max=132	
1.2	2008/10/23	P11	Starting Voltage 0℃ min=1208, Typ=1408 25℃ min=1143, Typ=1343	Starting Voltage 0℃ min=1735, Typ=1885, Max=2035 25℃ min=1600, Typ=1750, Max=1900	
2.0	2009/02/06		NA	Final Version Release	
2.1	2009/03/11	11		Backlight electrical specification modify	
		27		Modify shipping label format	
2.2	2009/5/7	11		Backlight electrical specification modify	

1. General Description

This specification applies to the 42 inch Color TFT-LCD Module T420HW05 V0. This LCD module has a TFT active matrix type liquid crystal panel 1920x1080 pixels, and diagonal size of 42 inch. This module supports 1920x1080 Full-HD mode (Non-interlace).

Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 8-bit gray scale signal and Frame Rate Control (FRC) for each dot.

The T420HW05 V0 has been designed to apply the 10bits 4 channel LVDS interface method. It is intended to support displays where high brightness, wide viewing angle, high color saturation, and high color depth are very important.

T420HW05 V0 Backlight unit used C-balance board (inverter-less) solution. This backlight unit should bundle integral TV power system to use.

* General Information

Items	Specification	Unit	Note
Active Screen Size	42.02	inches	
Display Area	930.24(H) x 523.26(V)	mm	
Outline Dimension	967.0(H) x 559.0(V) x 20.0(D)	mm	(without inverter)
Driver Element	a-Si TFT active matrix		
Display Colors	1073.7M	Colors	
Color Gamut	72	%	NTSC
Number of Pixels	1920 x 1080	Pixel	
Pixel Pitch	0.4845	mm	
Pixel Arrangement	RGB vertical stripe		
Display Mode	Normally Black		
Lamp quantity, type	22pcs, Straight type	pcs	
Surface Treatment	Anti-Glare coating (Haze 11%) Hard coating (3H)		

2. Absolute Maximum Ratings

The following are maximum values which, if exceeded, may cause faulty operation or damage to the unit.

Item	Symbol	Min	Max	Unit	Note
Power Supply Input Voltage	VDD	-0.3	14	[Volt]	1
Logic Input Voltage	Vin	-0.3	3.6	[Volt]	1
Ambient Operating Temperature	TOP	0	+50	[°C]	2
Ambient Operating Humidity	HOP	10	80	[%RH]	2
Storage Temperature	TST	-20	+60	[°C]	2
Storage Humidity	HST	10	80	[%RH]	2
Shock (non-operation)		-	50	G	3
Vibration (non-operation)		-	1.5	G	4
Thermal shock		-20	60	C	5
Panel surface temp			60	C	6

Note 1 : Duration = 50msec

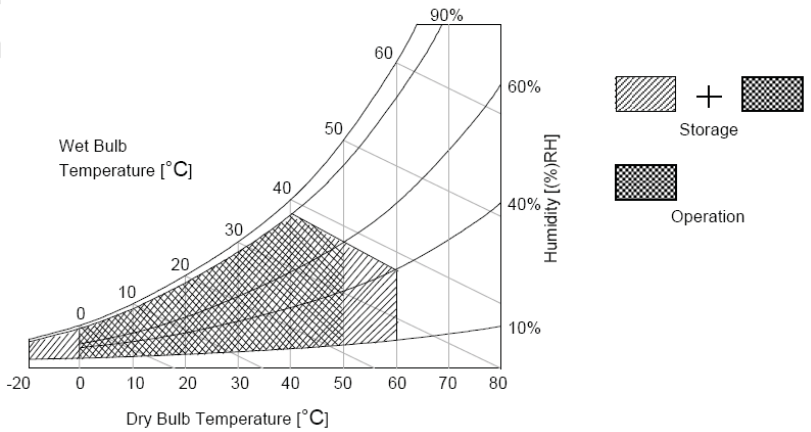
Note 2 : Maximum Wet-Bulb should be 50℃ and No condensation.

Note 3 : Half sine wave, shock level : 50G(11ms), direction : ±x, ±y, ±z (one time each direction)

Note 4 : Wave form : Random, vibration level : 1.5G RMS, Bandwidth : 10~300Hz
Duration : X,Y,Z 30min (one time each direction)

Note 5 : -20C/1hr ~ 60C/1hr, 100 cycles

Note 6 :Panel only (without TV set), Ambient temp 25C



3. Electrical Specification

The T420HW05 V0 requires two power inputs. One is employed to power the LCD electronics and to drive the TFT array and liquid crystal. The second input, which powers the CCFL, is typically generated by an power system.

3-1 Electrical Characteristics

Parameter		Symbol	Values			Unit	Notes
			Min	Typ	Max		
LCD:							
Power Supply Input Voltage		Vdd	10.8	12	13.2	Vdc	
Power Supply Input Current		Idd	-	0.6	1.1	A	1
Power Consumption		Pc	-	7.2		Watt	1
Inrush Current		I_{RUSH}	-	-	4	A	4
LVDS Interface	Differential Input High Threshold Voltage	V_{TH}			+100	mV	3
	Differential Input Low Threshold Voltage	V_{TL}	-100			mV	3
	Common Input Voltage	V_{CIM}	0.6	1.2	1.8	V	
CMOS Interface	Input High Threshold Voltage	V_{IH} (High)	2.0		3.3	Vdc	
	Input Low Threshold Voltage	V_{IL} (Low)	0		0.8	Vdc	
Life Time			50000			Hours	2

The performance of the Lamp in LCM, for example life time or brightness, is extremely influenced by the characteristics of the Integrated Power Board (IPB). All the parameters of an IPB should be carefully designed so as not to produce too much leakage current from high-voltage output of the IPB. When you design or order the IPB, please make sure unwanted lighting caused by the mismatch of the lamp and the IPB (no lighting, flicker, etc) never occurs. When you confirm it, the LCD Assembly should be operated in the same condition as installed in your instrument.

Do not attach a conducting tape to lamp connecting wire. If the lamp wire attach to conducting tape, TFT-LCD Module have a low luminance and the inverter has abnormal action because

leakage current occurs between lamp wire and conducting tape.

The relative humidity must not exceed 80% non-condensing at temperatures of 40℃ or less. At temperatures greater than 40℃, the wet bulb temperature must not exceed 39℃. When operate at low temperatures, the brightness of CCFL will drop and the lifetime of CCFL will be reduced.

Note :

1. Vdd=12.0V, fv=120Hz, f_{CLK}=80 Mhz , 25℃, Vdd Duration time= 400 μs , Test pattern : white pattern
2. The life is determined as the time at which luminance of the lamp is 50% compared to that of initial value at the typical lamp current on condition of continuous operating at 25±2℃.
3. VCIM = 1.2V

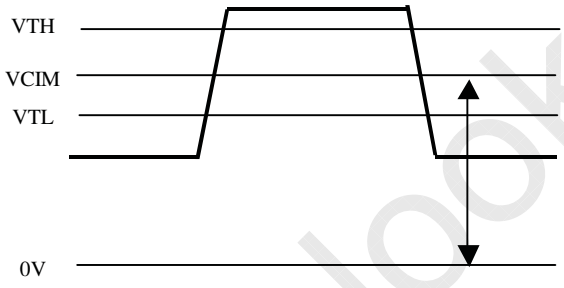
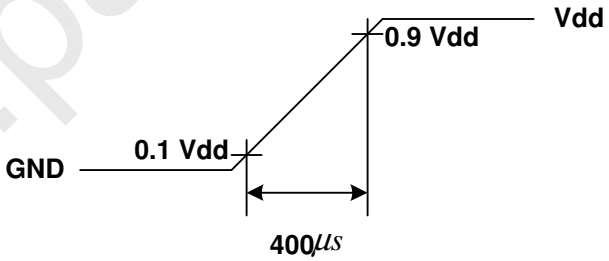


Figure : LVDS Differential Voltage

4. Measurement Condition: Rising time = 400 μ s



3-2 Interface Connections

- LCD connector 1 : P-TWO 187059-5122 which is compatible FI-RE51S-HF (JAE)

No	Symbol	Description	No	Symbol	Description
1	NC	No connection	27	NC or GND	No Connect or Ground
2	NC	No connection	28	R2_0-	LVDS Channel 2, Signal 0-
3	NC	No connection	29	R2_0+	LVDS Channel 2, Signal 0+
4	NC	No connection	30	R2_1-	LVDS Channel 2, Signal 1-
5	NC	No connection	31	R2_1+	LVDS Channel 2, Signal 1+
6	NC	No connection	32	R2_2-	LVDS Channel 2, Signal 2-
7	LVDS SEL	LVDS order, Low /Open for NS ,High for JEIDA	33	R2_2+	LVDS Channel 2, Signal 2+
8	NC	No connection	34	GND	Ground
9	NC	No connection	35	R2_CLK-	LVDS Channel 2, Clock -
10	NC	No connection	36	R2_CLK+	LVDS Channel 2, Clock +
11	GND	Ground	37	GND	Ground
12	R1_0-	LVDS Channel 1, Signal 0-	38	R2_3-	LVDS Channel 2, Signal 3-
13	R1_0+	LVDS Channel 1, Signal 0+	39	R2_3+	LVDS Channel 2, Signal 3+
14	R1_1-	LVDS Channel 1, Signal 1-	40	R2_4-	LVDS Channel 2, Signal 4-
15	R1_1+	LVDS Channel 1, Signal 1+	41	R2_4+	LVDS Channel 2, Signal 4+
16	R1_2-	LVDS Channel 1, Signal 2-	42	NC or GND	No Connect or Ground
17	R1_2+	LVDS Channel 1, Signal 2+	43	NC or GND	No Connect or Ground
18	GND	Ground	44	GND	Ground
19	R1_CLK-	LVDS Channel 1, Clock -	45	GND	Ground
20	R1_CLK+	LVDS Channel 1, Clock +	46	GND	Ground
21	GND	Ground	47	V_{LCD}	Operating Voltage supply, +12V DC regulated
22	R1_3-	LVDS Channel 1, Signal 3-	48	V_{LCD}	Operating Voltage supply,+12V DC regulated
23	R1_3+	LVDS Channel 1, Signal 3+	49	V_{LCD}	Operating Voltage supply, +12V DC regulated
24	R1_4-	LVDS Channel 1, Signal 4-	50	V_{LCD}	Operating Voltage supply, +12V DC regulated
25	R1_4+	LVDS Channel 1, Signal 4+	51	V_{LCD}	Operating Voltage supply, +12V DC regulated
26	NC or GND	No Connect or Ground	-	-	-

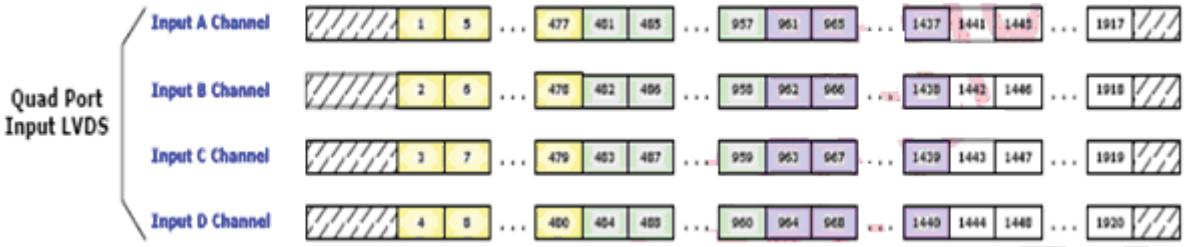
Note: 1. All GND (ground) pin should be connected together to the LCD module's metal frame.

2. All V_{LCD} (power input) pins should be connected.

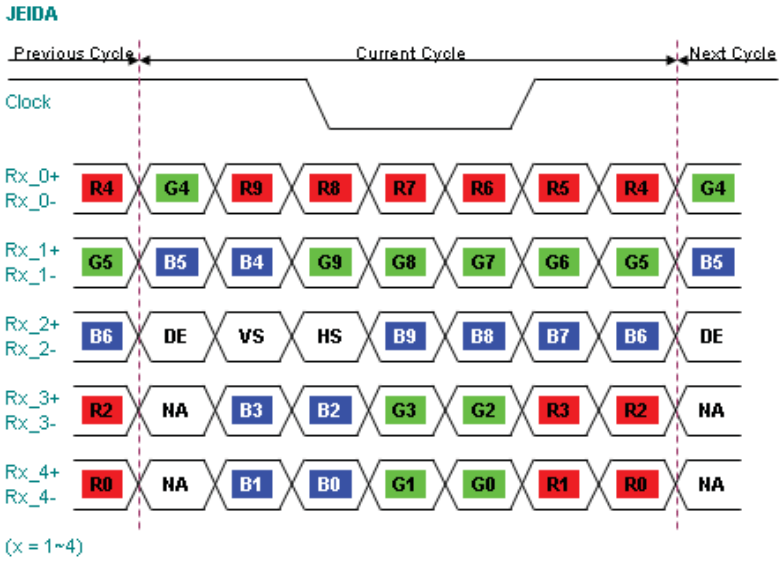
- LCD connector 2 : P-TWO 187060-4122 which is compatible FI-RE41S-HF (JAE)

No	Symbol	Description	No	Symbol	Description
1	NC	No connection	27	R4_0+	LVDS Channel 4, Signal 0+
2	NC	No connection	28	R4_1-	LVDS Channel 4, Signal 1-
3	NC	No connection	29	R4_1+	LVDS Channel 4, Signal 1+
4	NC	No connection	30	R4_2-	LVDS Channel 4, Signal 2-
5	NC	No connection	31	R4_2+	LVDS Channel 4, Signal 2+
6	NC	No connection	32	GND	Ground
7	NC	No connection	33	R4_CLK-	LVDS Channel 4, Clock -
8	NC	No connection	34	R4_CLK+	LVDS Channel 4, Clock +
9	GND	Ground	35	GND	Ground
10	R3_0-	LVDS Channel 3, Signal 0-	36	R4_3-	LVDS Channel 4, Signal 3-
11	R3_0+	LVDS Channel 3, Signal 0+	37	R4_3+	LVDS Channel 4, Signal 3+
12	R3_1-	LVDS Channel 3, Signal 1-	38	R4_4-	LVDS Channel 4, Signal 4-
13	R3_1+	LVDS Channel 3, Signal 1+	39	R4_4+	LVDS Channel 4, Signal 4+
14	R3_2-	LVDS Channel 3, Signal 2-	40	NC or GND	No Connect or Ground
15	R3_2+	LVDS Channel 3, Signal 2+	41	NC or GND	No Connect or Ground
16	GND	Ground			
17	R3_CLK-	LVDS Channel 3, Clock -			
18	R3_CLK+	LVDS Channel 3, Clock +			
19	GND	Ground			
20	R3_3-	LVDS Channel 3, Signal 3-			
21	R3_3+	LVDS Channel 3, Signal 3+			
22	R3_4-	LVDS Channel 3, Signal 4-			
23	R3_4+	LVDS Channel 3, Signal 4+			
24	NC or GND	No Connect or Ground			
25	NC or GND	No Connect or Ground			
26	R4_0-	LVDS Channel 4, Signal 0-			

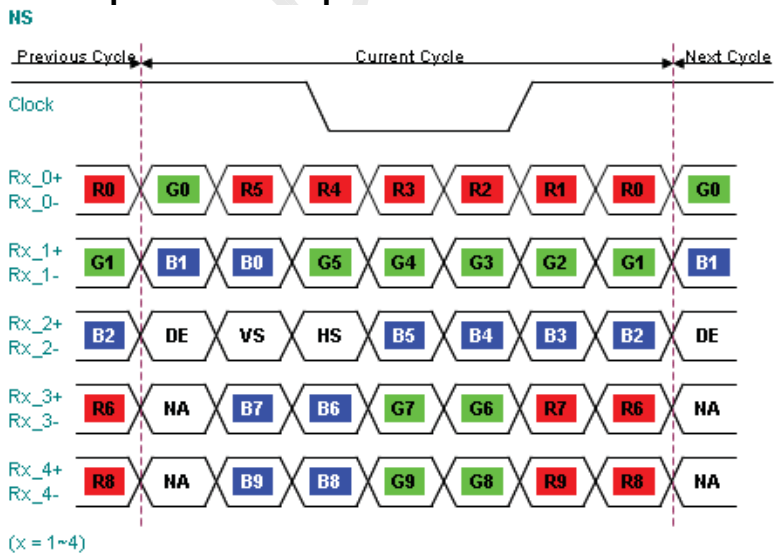
4 CH LVDS data mapping



LVDS Option = High➔JEIDA



LVDS Option = Low/Open➔NS



Backlight Connector Pin Configuration

Electrical specification

	Description		Min	Typ	Max	Unit	Condition
1	BL Operating Voltage	VBL	1196	1396	1596	Vrms	1. BL each side operating voltage at dimming ratio 100% 2. Calculation method: (notes 1) 3. fo=58KHz, IBL= 125mArms
2	BL Operating Current	IBL	110	125	135	mArms	1. BL each side operating current at dimming ratio 100%
3	Starting Voltage 0℃	Vs	1650	1800	1950	Vrms	1. BL each side striking voltage. 2. Measurement by disconnect IPB and BL
4	Operating frequency	fo	50	55	60	kHz	
5	Striking time	St	1000	1500	2000	msec	
6	Power Consumption	PBL	142	150	158	Watt	
7	PWM Operating Frequency	F_PWM	140	-	240	Hz	95~140Hz might cause waterfall noise but not influence panel function
8	PWM Dimming Duty ratio	D_PWM	10	-	100	%	1. luminance is from 10% to 100% 2. note 2
9	Lamp type		Straight type				
10	Number of lamps		22			pcs	
11	Type of current balance		Capacitor				
12	C ballast	Cb	14.25	15	15.75	pF	

（Ta=25±5℃, Turn on for 45minutes）

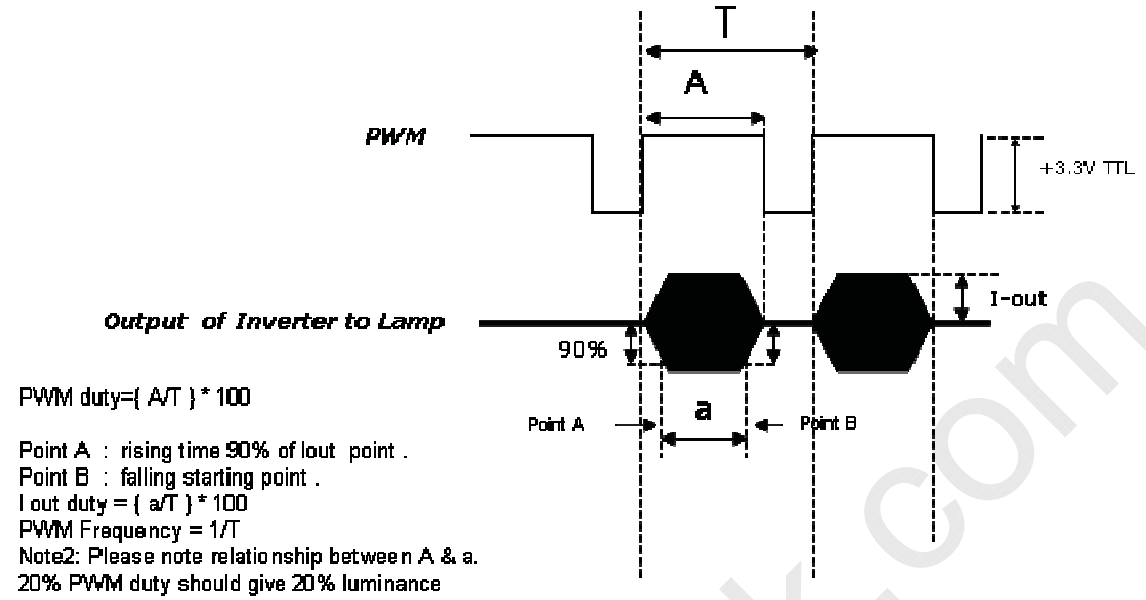
2. Lamp specification (Recommendation)

	Description		Min	Typ	Max	Unit
1	Lamp Voltage	Vlamp		1145		Vrms
2	Lamp Current	Ilamp	5.22	5.7	6.14	mArms
3	Lamp frequency	flamp	40	-	80	KHz
4	Starting Voltage	0℃		-	1580	Vrms
		25℃			1450	Vrms
5	Striking time	St	1000	-	-	msec
6	Discharge Stabilization Time		-	-	3	Min
7	Life time		50K	-	-	hr

Notes 1:

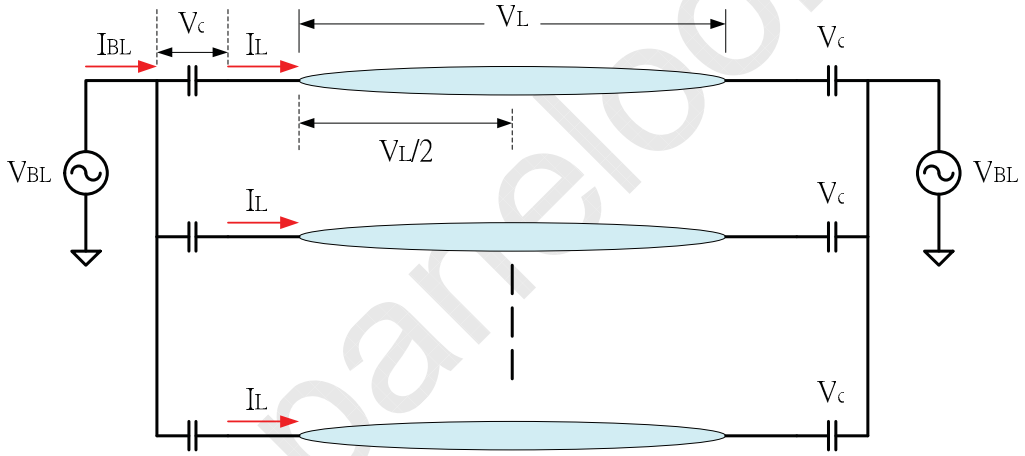
$$V_{BL} = \sqrt{\left(\frac{V_L}{2}\right)^2 + (V_C)^2}$$

Notes 2:



PWM duty=(A/T) * 100

Point A : rising time 90% of Iout point .
Point B : falling starting point .
I out duty = (a/T) * 100
PWM Frequency = 1/T
Note2: Please note relationship between A & a.
20% PWM duty should give 20% luminance



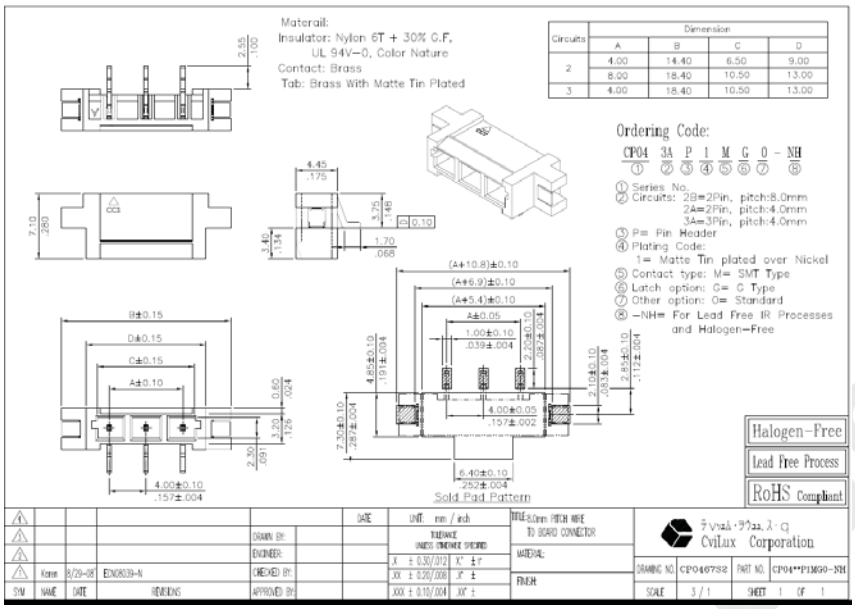
3. Pin assignment, connector drawing and connection configuration

CN1: CP042AP1MGA-NH S3 (CviLux) or equivalent

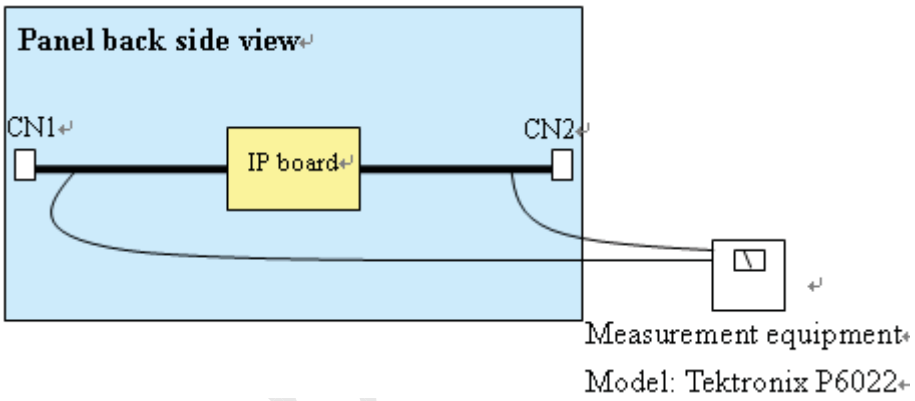
PIN #	Symbol	Description
1	High	I/P board high voltage supply
2	High	I/P board high voltage supply

CN2: CP042AP1MG0- NH (CviLux) or equivalent

PIN #	Symbol	Description
1	High	I/P board high voltage supply
2	High	I/P board high voltage supply



4. Measurement method



3-3 Signal Timing Specifications

This is the signal timing required at the input of the User connector. All of the interface signal timing should be satisfied with the following specifications for it's proper operation.

Timing Table (DE only Mode)

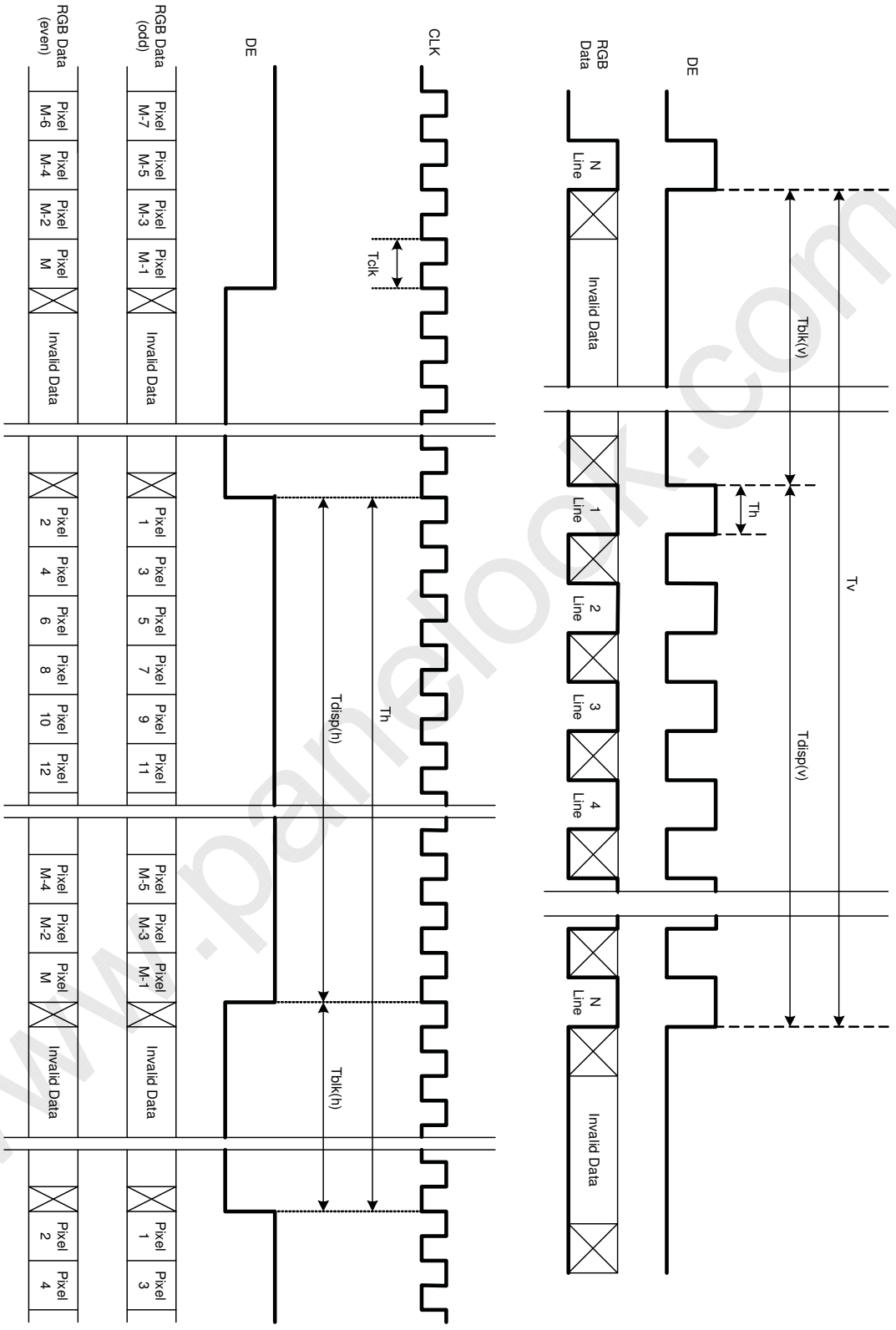
Vertical Frequency Range A (120Hz)

Signal	Item	Symbol	Min	Type	Max	Unit
Vertical Section	Period	Tv	1096	1130	1160	Th
	Active	Tdisp (v)		1080		Th
	Blanking	Tblk (v)	16	50	80	Th
Horizontal Section	Period	Th	560	570	580	Tclk
	Active	Tdisp (h)		480		Tclk
	Blanking	Tblk (h)	80	90	100	Tclk
Clock	Period	CLK		12.94		ns
	Frequency	Freq	73.65	77.29	80.74	MHz
Vertical Frequency	Frequency	Vs	118	120	122	Hz
Horizontal Frequency	Frequency	Hs	131.52	135.6	139.2	KHz

Vertical Frequency Range B (100Hz)

Signal	Item	Symbol	Min	Type	Max	Unit
Vertical Section	Period	Tv	1200	1280	1392	Th
	Active	Tdisp (v)		1080		Th
	Blanking	Tblk (v)	120	200	312	Th
Horizontal Section	Period	Th	560	570	580	Tclk
	Active	Tdisp (h)		480		Tclk
	Blanking	Tblk (h)	80	90	100	Tclk
Clock	Period	CLK		13.70		ns
	Frequency	Freq	67.2	72.96	80.74	MHz
Vertical Frequency	Frequency	Vs	96	100	102	Hz
Horizontal Frequency	Frequency	Hs	120	128	139.2	KHz

3-4 Signal Timing Waveforms



3-5 Color Input Data Reference

The brightness of each primary color (red, green and blue) is based on the 8 bit gray scale data input for the color; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

COLOR DATA REFERENCE

Color		Input Color Data																													
		RED										GREEN										BLUE									
		MSB										MSB										MSB									
		R9	R8	R7	R6	R5	R4	R3	R2	R1	R0	G9	G8	G7	G6	G5	G4	G3	G2	G1	G0	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1023)	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1023)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
	Blue(1023)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(001)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

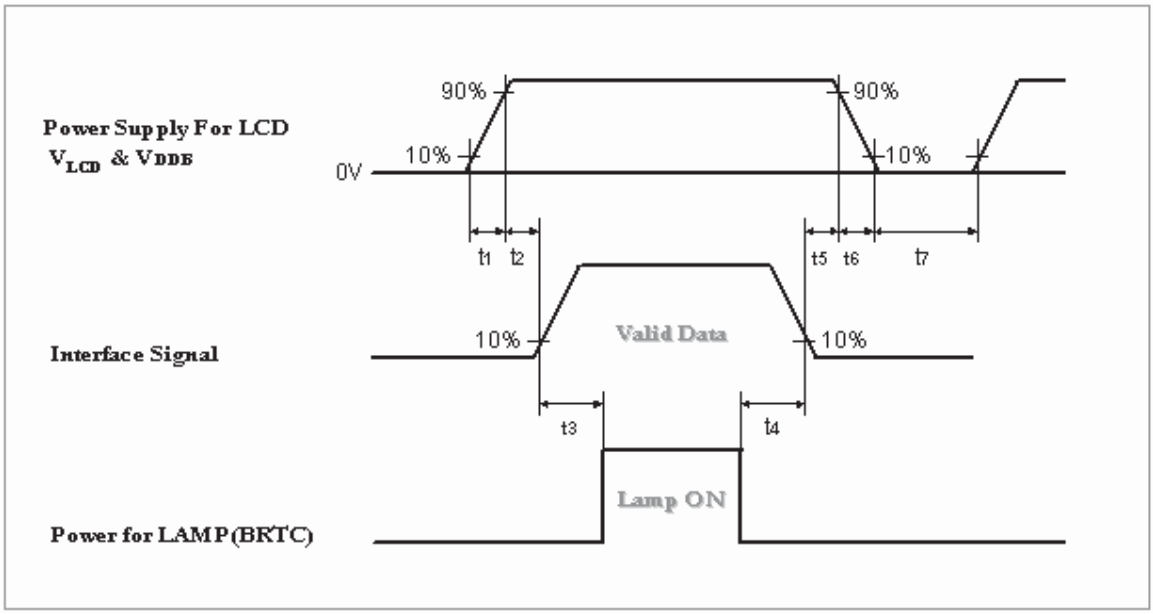
	RED(1022)	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1023)	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

	GREEN(1022)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1023)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
BLUE	BLUE(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

	BLUE(1022)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
	BLUE(1023)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1

3-6 Power Sequence

1. Power sequence of panel



Parameter	Values			Units
	Min.	Typ.	Max.	
t1	0.4	-	30	ms
t2	0.1	-	50	ms
t3	300	-	-	ms
t4	10	-	-	ms
t5	0.1	-	50	ms
t6		-	300	ms
t7	500	-	-	ms

Apply the lamp voltage within the LCD operating range. When the backlight turns on before the LCD operation or the LCD turns off before the backlight turns off, the display may momentarily become abnormal.

Caution : The above on/off sequence should be applied to avoid abnormal function in the display. In case of handling, make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.

4.Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 60 minutes in a dark environment at 25℃. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of Φ and θ equal to 0°.

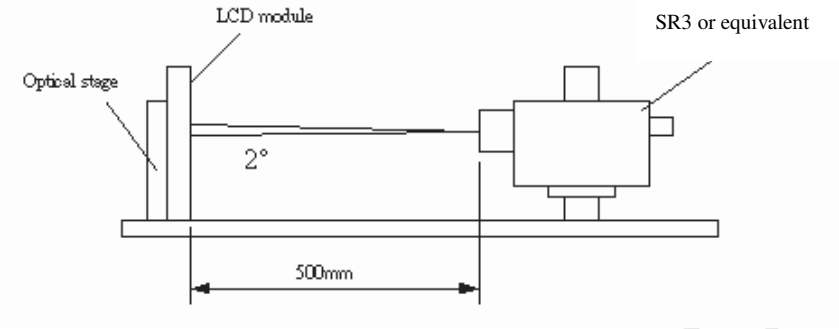


Fig.4-1 Optical measurement equipment and method

Parameter		Symbol	Values			Units	Notes
			Min.	Typ.	Max.		
Contrast Ratio		CR	3200	4000			1
Surface Luminance, white		LWH	400	500		cd/m²	2
Luminance Variation		δ_{WHITE} 5p			1.3		3
Response Time (Average)		T γ		5.5		ms	4,5 (Gray to Gray)
Color Coordinates							
	RED	R_X	Typ.-0.03	0.640	Typ.+0.03		
		R_Y		0.330			
	GREEN	G_X		0.290			
		G_Y		0.600			
	BLUE	B_X		0.150			
		B_Y		0.060			
	WHITE	W_X		0.280			
		W_Y		0.290			
Viewing Angle							Contrast Ratio>10
	x axis, right(φ=0°)	θ_r		89		Degree	6
	x axis, left(φ=180°)	θ_l		89			
	y axis, up(φ=90°)	θ_u		89			
	y axis, down (φ=0°)	θ_d		89			

Note:

1. Contrast Ratio (CR) is defined mathematically as:

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}}$$

2. Surface luminance is luminance value at point 1 across the LCD surface 50cm from the surface with all pixels displaying white. From more information see Fig. 4-2. When V_{DDB} = 24V, I_{DDB} = 6.4A. $L_{WH}=L_{on1}$, Where L_{on1} is the luminance with all pixels displaying white at center 1 location.

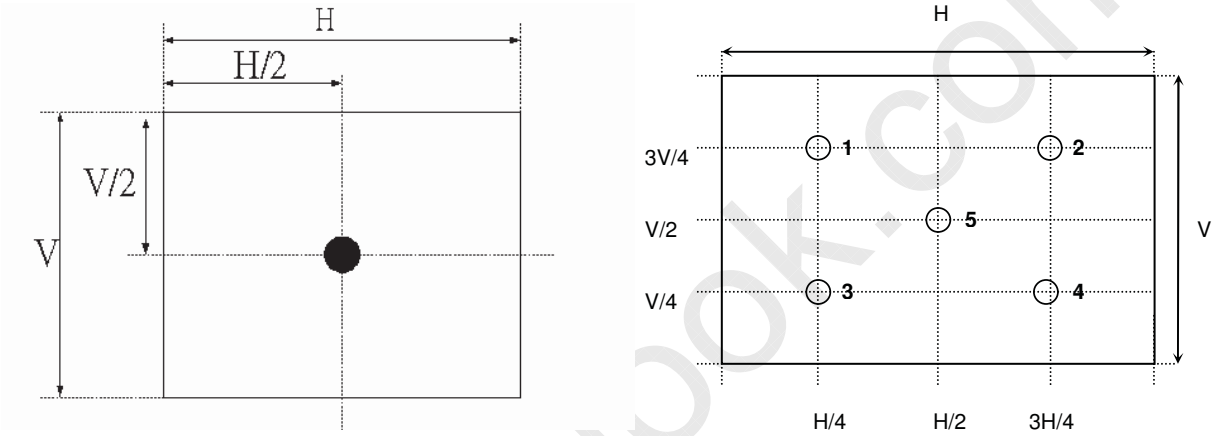


Fig.4-2 Optical measurement point

3. The variation in surface luminance, δ_{WHITE} is defined under 100% brightness as:

$$\delta_{WHITE(5P)}=\text{Maximum}(L_{on1}, L_{on2},\ldots,L_{on5})/\text{Minimum}(L_{on1}, L_{on2},\ldots L_{on5})$$

4. Response Time:

(a) Tr = full black to full white, 10%~90%

(b) Tf = full white to full black, 90%~10%

(c) G-to-G: average response time among brightness of 0%, 25%, 50%, 75% &100%.

	0%	25%	50%	75%	100%
0%		tr: 0%→25%	tr: 0%→50%	tr: 0%→75%	tr: 0%→100%
25%	tf: 25%→0%		tr: 25%→50%	tr: 25%→75%	tr: 25%→100%
50%	tf: 50%→0%	tf: 50%→25%		tr: 50%→75%	tr: 50%→100%
75%	tf: 75%→0%	tf: 75%→25%	tf: 75%→50%		tr: 75%→100%
100%	tf: 100%→0%	tf: 100%→25%	tf: 100%→50%	tf: 100%→75%	

5. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see Fig. 4-3. (Optical measurement by SR3)

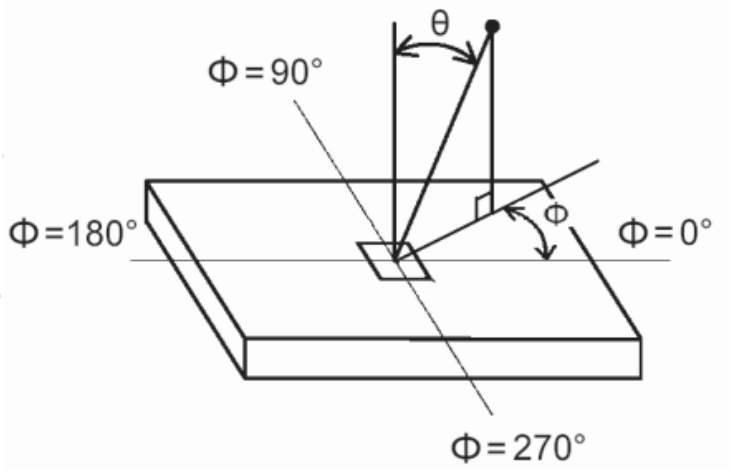


Fig.4-3 Viewing Angle Definition

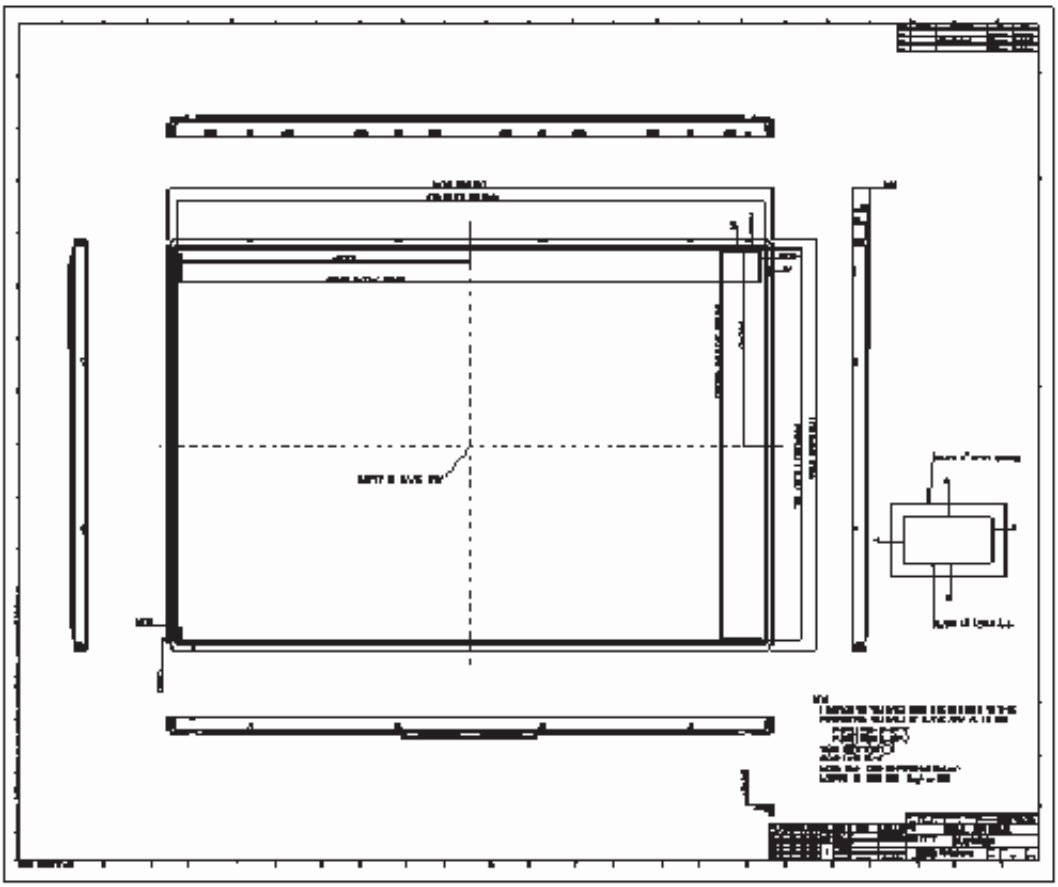
5.Mechanical Characteristics

The contents provide general mechanical characteristics for the model T420HW05. In addition the figures in the next page are detailed mechanical drawing of the LCD.

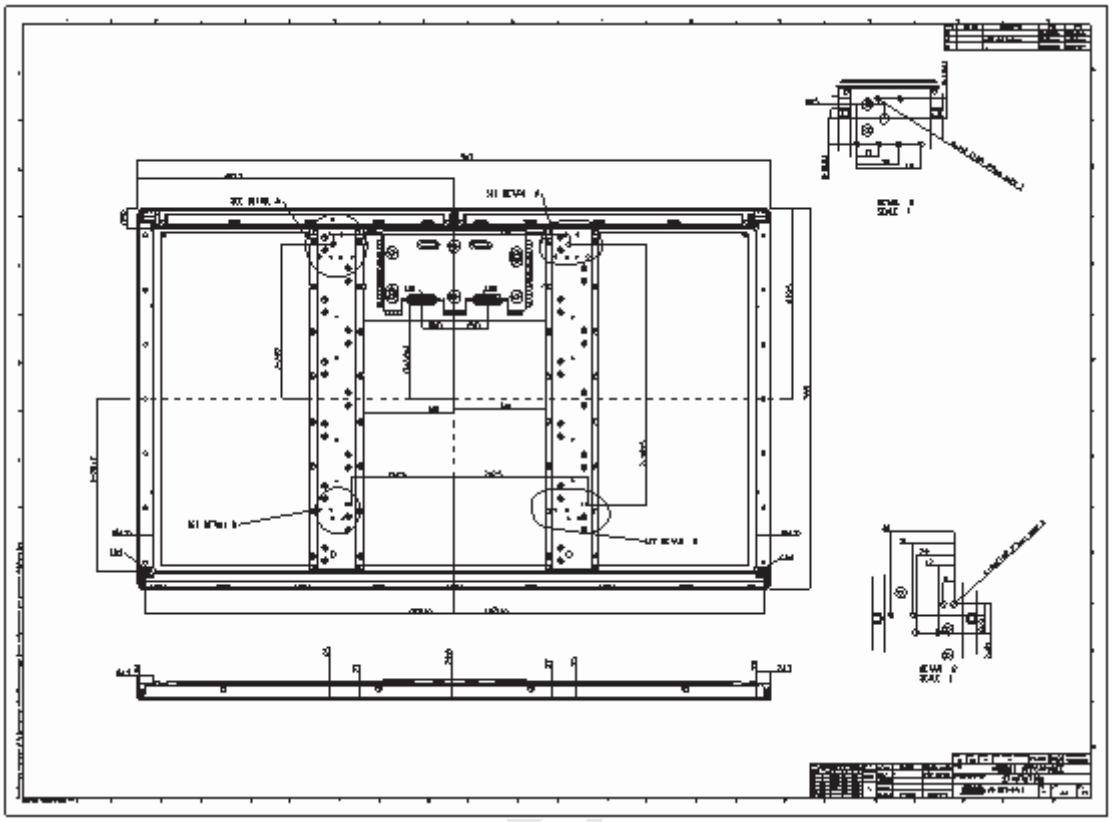
Outline Dimension	Horizontal (typ.)	967.0 mm
	Vertical (typ.)	559.0 mm
	Depth (typ.)	20.0 mm (without inverter)
Bezel Area	Horizontal (typ.)	939.0mm
	Vertical (typ.)	531 mm
Active Display Area	Horizontal	930.24mm
	Vertical	523.26mm
Weight	8000 g (typ.)	
Surface Treatment	AG, 3H	

2D drawing

Front view



Rear view



6.Reliability

Panel condition in RA test

Brightness: 500nits

No	Test Item	Condition
1	High temperature storage test	Ta=60℃ 300h
2	Low temperature storage test	Ta= -20℃ 300h
3	High temperature operation test	Ta=50℃ 300h
4	Low temperature operation test	Ta=-5℃ 300h
5	Vibration test (non-operating)	Wave form: random Vibration level: 1.5G RMS Bandwidth: 10-300Hz, Duration: X, Y, Z 30min One time each direction
6	Shock test (non-operating)	Shock level: 50G Waveform: half since wave, 11ms Direction: ±X, ±Y, ±Z One time each direction
7	Vibration test (with carton)	Wave form: random Vibration level: 1.5G RMS Bandwidth: 10-200Hz, Duration: X, Y, Z 30min One time each direction
8	Drop test (with carton)	Height: 25.4cm 6 surfaces (ASTMD4169-I)

Result Evaluation Criteria

There should be no change which might affect the practical display function when the display quality test is conducted under normal operating condition.

7. International Standard

7-1. Safety

(1) CSA E60065, Canadian Standards Association
Standard for Safety of Information Technology Equipment Including Electrical Business Equipment.

(2) IEC 60065 ver. 7th,European Committee for Electro technical Standardization (CENELEC)
EUROPEAN STANDARD for Safety of Information Technology Equipment Including Electrical Business Equipment.

7-2. EMC

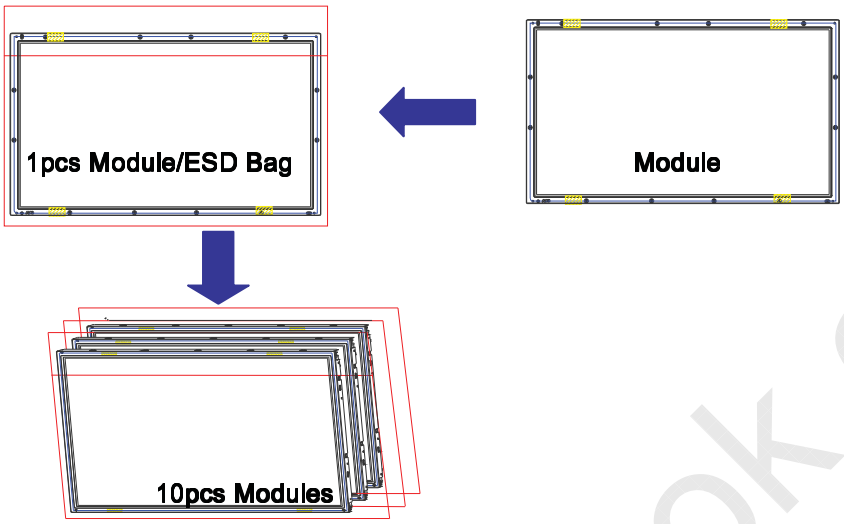
(1) ANSI C63.4 “Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electrical Equipment in the Range of 9kHz to 40GHz. “American National standards Institute(ANSI), 1992

(2) C.I.S.P.R “Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment.” International Special committee on Radio Interference.

(3) EN 55022 “Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment.” European Committee for Electro technical Standardization. (CENELEC), 1998

8.Packing

8-1 Packing Instruction

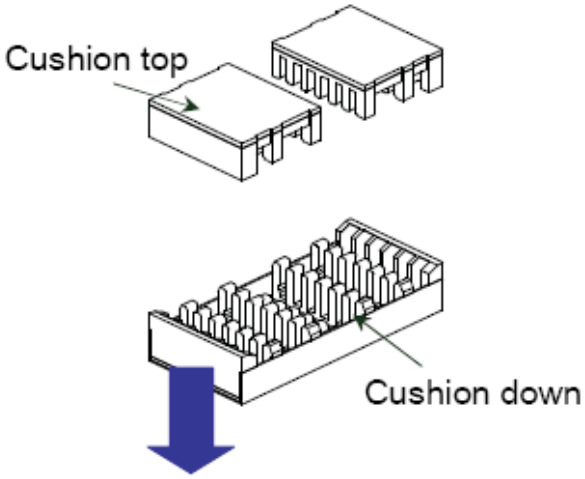


Cushion set

Package information:

Carton outside dimension : 1060x560x650mm

Carton/Package weight : 86kg



10pcs / 1 carton

T420HW05 V0

Shipping label

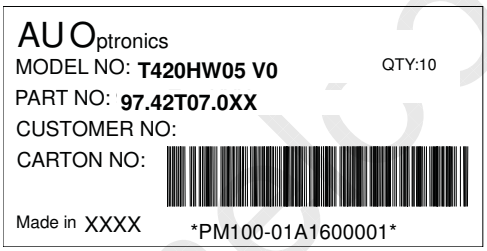
Green Mark Description:

For Pb Free products, AUO will add for identification.

For RoHS compatible products, AUO will add for identification.

Note: The Green Mark will be present only when the green documents have been ready by AUO Internal Green Team. (The definition of green design follows the AUO green design checklist.)

Carton label



Pallet information

By air cargo : : (2x1) x2 layers, one pallet put 4 boxes, total 40 pcs module.

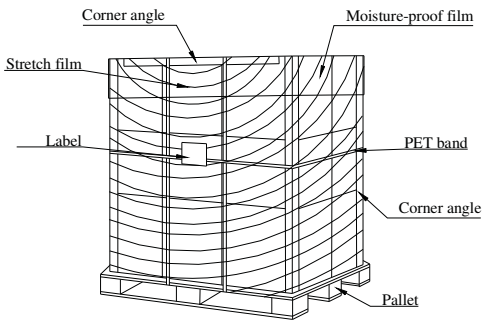
By sea : (2x1) x3 layers, one pallet put 6 boxes, total 60 pcs module.

Pallet dimension : 1150x1070x138mm

Pallet weight : 10kg

By air total weight : 86 kg/box X 4 boxes=344 kg (with pallet weight 354kg)

By sea total weight : 86 kg/box X 6 boxes=516 kg (with pallet weight 526kg)



9.PRECAUTIONS

Please pay attention to the followings when you use this TFT LCD module.

9-1 MOUNTING PRECAUTIONS

(1) You must mount a module using holes arranged on back side of panel. The plug force of connector should be less than 8Kg

(2) Please attach the surface transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to the resist external force.

(3) You should adopt radiation structure to satisfy the temperature specification.

(4) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.

(5) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of polarizer for bare hand or greasy cloth. (Some cosmetics are detrimental to the polarizer.)

(6) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front/ rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.

(7) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.

(8) Do not open the case because inside circuits do not have sufficient strength.

9-2 OPERATING PRECAUTIONS

(1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage: V=±200mV(Over and under shoot voltage)

(2) Response time depends on the temperature. (In lower temperature, it becomes longer..)

(3) Brightness depends on the temperature. (In lower temperature, it becomes lower.) And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.

(4) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.

(5) When fixed patterns are displayed for a long time, remnant image is likely to occur.

(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interface.

9-3 ELECTROSTATIC DISCHARGE CONTROL

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.

9-4 PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

9-5 STORAGE

When storing modules as spares for a long time, the following precautions are necessary.

(1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.

(2) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

9-6 HANDLING PRECAUTIONS FOR PROTECTION FILM

(1) The protection film is attached to the bezel with a small masking tape. When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.

(2) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of flue still on the Bezel after the protection film is peeled off.

(3) You can remove the glue easily. When the glue remains on the Bezel or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.

Appendix

Impedance of Pin7 of LVDS : 4.2K(Ω)